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M.A./M.Sc. Semester III Examination, 2020 (CBCS)

Subject: Mathematics [New Syllabus]

Course: MMATMIE308-1 (Introduction to Operations Research)

Time: 1 Hour Full Marks: 20

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
[Notations and symbols have their usual meanings]

Answer any ***two*** questions. Only ***first two*** answers will be evaluated. 10×2 = 20

1 (a) Show that The set of all feasible solutions to a linear programming problem is a closed convex set. [5]

(b) Examine whether $x_1^2 + x_2^2 \leq 25$ is a convex set or not. [5]

2 (a) What do you mean by saddle point of two persons zero sum game? [2]

(b) Write a brief description about payoff matrix of two persons zero sum game. [2]

(c) Solve the game whose payoff matrix is given by [6]

$$\begin{array}{c} \\ \textit{Player A} \end{array} \begin{array}{c} \begin{array}{cccc} \textit{Player B} & & & \\ B_1 & B_2 & B_3 & B_4 \end{array} \\ \begin{array}{c} A_1 \\ A_2 \\ A_3 \\ A_4 \end{array} \begin{bmatrix} 1 & 2 & -2 & 2 \\ 3 & 1 & 2 & 3 \\ -1 & 3 & 2 & 1 \\ -2 & 2 & 0 & 3 \end{bmatrix} \end{array}$$

3 (a) What do you mean by stationary point? [2]

(b) Write a brief description about Lagrange multiplier method. [2]

(c) Solve the following problem by Lagrange multiplier method: [6]

$$\text{Maximize } z = x_1^2 - 10x_1 + x_2^2 - 6x_2 + x_3^2 - 4x_3$$
$$\text{subject to } \quad x_1 + x_2 + x_3 = 7.$$